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Comparative Assessment of the Fracture Behaviour of API-5L X65 and Micro-alloyed Steels in E80 Simulated Fuel Ethanol Environment

Authors

Authors and affiliations

O. O. Joseph Email author S. Sivaprasad, S. TarafderJ. A. Ajayi

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Abstract

Monotonic J-integral tests were carried out on API-5L X65 steel and micro-alloyed steel (MAS) in E80 simulated fuel grade ethanol (SFGE) environment using three-point bend specimens. A ramp rate of 10–04 mm/s was used for loading in each sequence so as to enhance stress corrosion cracking (SCC) influence if any. The influence of the SFGE environment on tearing resistance and fracture toughness of the steels was studied. Both steels exhibited decrease in fracture toughness in E80 in relation to air. The decrease in fracture toughness may be due to anodic dissolution at the crack tip. Ductile tearing resistance of the steels increased in E80 due to decline in toughness property. In comparison with X65 steel, MAS showed better fracture properties.

Keywords

J-integral Fracture SFGE E80 Steels

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Notes

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